REMARKS

In the Office Action dated December 18, 2007, the Examiner: (1) rejected claim 11 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,785,292 to Vogel ("Vogel") in view of U.S. Patent No. 7,086,082 to Kokkinen ("Kokkinen") and further in view of U.S. Patent No. 6,940,874 to Ruszczyk et al. ("Ruszczyk"); (2) rejected claims 39, 42-44, 46, 49-51, and 53-55 under 35 U.S.C. § 103(a) as unpatentable over Ruszczyk in view of U.S. Patent No. 6,757,253 to Cooper et al. ("Cooper"); (3) rejected claims 41, 48, and 57 under 35 U.S.C. § 103(a) as unpatentable over Ruszczyk in view of Cooper and further in view of U.S. Patent Application Publication No. 2006/0013124 to Fottak ("Fottak"); and (4) rejected claims 45, 52, and 56 under 35 U.S.C. § 103(a) as unpatentable over Ruszczyk in view of Cooper and further in view of Kokkinen. Applicant respectfully traverses these rejections.

Applicant amends claims 11, 39, 41, 43-46, 48, 50-55, and 57 to improve form. No new matter has been added. Claims 11, 39, 41-46, and 48-57 are currently pending.

1. Rejection of claim 11 under § 103(a)

Claim 11 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Vogel in view of Kokkinen and in further view of Ruszczyk. Applicant respectfully traverses this rejection.

Amended claim 11 recites:

> A method of scheduling cable modems in a broadband communications system, comprising:
> receiving bandwidth allocation requests from the cable modems;
> for each of the bandwidth allocation requests, determining a mini-slot size based on a modulation and symbol rate associated with a respective bandwidth allocation request;
> scheduling transmission on a physical upstream channel from the cable modems associated with each of the bandwidth allocation requests based on a respective mini-slot;
> segregating the physical upstream channel into multiple virtual upstream channels, where each of the multiple virtual upstream channels is associated with a different modulation and

> symbol rate;
>
> grouping the cable modems into a plurality of groups; and
>
> assigning a different one of the multiple virtual upstream channels to each of the plurality of groups for upstream transmission.

Vogel, Kokkinen, and Ruszczyk, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 11. For example, the Examiner acknowledges that Vogel "fails to disclose determining mini-slot size based on symbol rate and modulation type," as recited in claim 11. (Office Action at p. 3.) Instead, the Examiner relies on column 5, lines 35-40, of Kokkinen for allegedly disclosing this feature. (Office Action at p. 3.) At column 5, lines 35-40, Kokkinen discloses:

> In the arrangement of the invention, the smallest separate unit of the data transmission capacity given to the use of one data terminal equipment is a mini slot, the size of which is selected most advantageously so that the added temporal length of three successive mini slots is substantially the same as the length of one state-of-the-art slot. It is also possible to determine a mini slot of another size.

This section of Kokkinen discloses including three mini-slots in every slot. This section of Kokkinen, however, says nothing about determining the mini-slot size "based on a modulation and symbol rate associated with a respective bandwidth allocation request," as recited in claim 11.

In fact, the Examiner does not even allege that Kokkinen, or any other reference, discloses or suggests determining a mini-slot size "based on a modulation and symbol rate associated with a bandwidth allocation request," as recited in claim 11. The Examiner only alleges that Kokkinen merely "discloses determining mini-slot size." (Office Action at p. 3.)

Ruszczyk does not cure the deficiencies of Vogel and Kokkinen. Ruszczyk also does not disclose or suggest "determining a mini-slot size based on a modulation

and symbol rate associated with a respective bandwidth allocation request," as recited in claim 11. In addition, the Examiner does not allege that Ruszczyk discloses or suggests "determining a mini-slot size based on a modulation and symbol rate associated with a respective bandwidth allocation request," as recited in claim 11.

In view of the remarks above, Applicant submits that Vogel, Kokkinen, and Ruszczyk, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 11. Applicant respectfully requests that the rejection of claim 11 under § 103(a) be withdrawn.

2. Rejection of claims 39, 42-44, 46, 49-51, and 53-55 under 35 U.S.C. § 103(a)

Claims 39, 42-44, 46, 49-51, and 53-55 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ruszczyk in view of Cooper. Applicant respectfully traverses this rejection.

a. Claims 39 and 42-44

Amended claim 39 recites:

> A method, comprising:
> grouping cable modems into a plurality of groups of cable modems, where the cable modems are grouped into the plurality of groups based on a latency associated with each of the plurality of groups; and
> assigning a different virtual upstream channel to each of the plurality of groups, where each virtual upstream channel is associated with a different modulation, symbol rate or preamble.

The Examiner admits that Ruszczyk does not disclose or suggest grouping cable modems based on a latency associated with each of the plurality of groups. (Office Action at p. 4.) The Examiner, however, alleges that Cooper, in column 9, lines 18-32, discloses "identifying the cable modem with the group delay." (Office Action at p. 4.) This portion of Cooper discloses:

> By identifying the cable modem which exhibits the greatest improvement in SNR when an equalizer is enabled, we are affectively identifying the cable modem with the greatest group delay/amplitude distortion. The modem with the greatest group delay/amplitude distortion results because it is located the deepest in the plant, i.e., it's return path signal must pass through more Diplex filters than any of the other modems. Each Diplex filter has an additive effect on the group delay. At the high end of the frequency spectrum, i.e., at the point where the filter begins to roll off, this affect is the most pronounced. This approach has therefore achieved the same results as utilizing the DOCSIS ranging timing offset without the need for such a parameter.

Thus, Cooper discloses identifying the cable modem with the greatest "group delay," which is located "deepest" in the plant. (Column 9, lines 18-32.) For clarity, it is noted that the word "group" in "group delay" refers to a group of interfering waves, not a group of cable modems. This is evident from the IEEE definition of "group delay" and "group delay time:"

> **Group delay** (dispersive and nondispersive delay line). The derivative of radial phase with respect to radian frequency, $\delta\varphi/\delta\omega$. It is equal to the phase delay for an ideal nondispersive delay device, but may differ greatly where there is a ripple in the phase vs. frequency characteristic. *See:* **envelope delay**.
>
> **Group delay time.** The rate of change, with angular frequency , of the total phase shift through a network. *Notes:* (1) Group delay time is the time interval required for the crest of a group of interfering waves to travel through a 2-port network, where the component wave trains have slightly different individual frequencies. (2) Group delay time is usually very close in value to envelope delay and transmission time delay, and in the case of vanishing spectrum bandwidth of the signal these quantities become identical. *See:* **measurement system.**

(Appendix A; IEEE Standard Dictionary of Electrical and Electronics Terms, 1984, at p. 400; underline added here.) Although Cooper may disclose determining the cable modem having the greatest "group delay," Cooper does not disclose or suggest "grouping cable modems into a plurality of groups of cable modems," as recited in claim 39. Nor does Cooper disclose or suggest "where the cable modems are grouped into the plurality of groups based on a latency associated with each of the plurality of groups," as recited in claim 39.

In view of the remarks above, Applicant submits that Ruszczyk and Cooper, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 39. Applicant respectfully requests that the rejection of claim 39 under § 103(a) be withdrawn.

Claims 42-44 depend on claim 39 and include all the features of claim 39. Therefore, claims 42-44 are allowable over Ruszczyk in view of Cooper for at least the reasons set forth above with respect to claim 39. Therefore, Applicant respectfully requests that the rejection of claims 42-44 under § 103(a) be withdrawn.

b. Claims 46, 49-51, and 53-55

Although claims 46 and 53 have different scope than each other and claim 39, they include some similar recitations as claim 39. For example, claim 46 recites "grouping cable modems into a plurality of groups of cable modems" and "where the cable modems are grouped into the plurality of groups based on a latency associated with each of the plurality of groups." Claim 53 recites "grouping cable modems into different groups of cable modems based on latencies associated with the cable modems." Therefore, claims 46 and 53 are allowable over Ruszczyk in view of Cooper for similar reasons to those set forth above with respect to claim 39. Applicant respectfully requests that the rejection of claims 46 and 53 under § 103(a) be withdrawn.

Claims 49-51, 54, and 55 depend on independent claim 46 or 53. Therefore, these claims are allowable for at least the reasons set forth above with respect to claims 46 and 53. Thus, Applicant respectfully requests that the rejection of claims 49-51, 54, and 55 under § 103(a) be withdrawn.

3. Rejection of claims 41, 48, and 57 under 35 U.S.C. § 103(a)

Dependent claims 41 and 48 and independent claim 57 stand rejected under 35 U.S.C.

§ 103(a) as unpatentable over Ruszczyk in view of Cooper and further in view Fottak. Applicant respectfully traverses this rejection.

Claims 41 and 48 depend on claims 39 and 46, respectively, and include all the features of their respective base claims. Fottak does not cure the deficiencies of Ruszczyk and Cooper discussed above with respect to claims 39 and 46. Therefore, none of Fottak, Ruszczyk, or Cooper, whether taken alone or in any reasonable combination, discloses or suggests all of the features of clams 41 and 48. At least for this reason, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 41 and 48 under § 103(a).

In addition to the arguments put forth above with respect to claim 39, dependent claim 41 is patentable over Ruszczyk, Cooper, and Fottak for at least an additional reason. For example, dependent claim 41 recites "differentiating slower cable modems from faster cable modems" and "assigning bandwidth to the cable modems based on the differentiation to allow the slower cable modems to transmit data proportionately more frequently than the faster cable modems." The Examiner admits that Ruszczyk "fails to disclose differentiating slower cable modems from faster cable modems and assigning bandwidth to the cable modems based on the differentiation such that the slower cable modems are allowed to transmit data more frequently than faster cable modems." (Office Action at p. 6.) Instead, the Examiner cites to paragraph 0100, lines 14-16, (which the Examiner mistakenly identified as paragraph 0010) of Fottak for allegedly disclosing these features.

At paragraph 0100, lines 14-16, Fottak discloses:

> For example, if at state 94, it is determined that one of the modems operates at a different speed than the other modem, at state 96, the faster modem may adjust its speed to a lower speed, specifically that of the slower modem's speed or yet a further slower speed, in order to effectively communicate with the latter.

This section of Fottak discloses slowing down the transmission speed of one modem in order for it to communicate directly with a slower modem. Fottak has nothing to do with "assigning bandwidth . . . based on the differentiation to allow the slower cable modems to transmit data proportionately more frequently than the faster cable modems," as recited in claim 41.

Furthermore, the Examiner alleges that Fottak merely discloses "identifying modems operating at different speed." (Office Action at p. 6.) This alleged disclosure of Fottak falls far short of the acknowledged deficiencies of Ruszczyk, specifically that Ruszczyk fails to disclose "assigning bandwidth to the cable modems based on the differentiation such that the slower cable modems are allowed to transmit data more frequently than faster cable modems." (Office Action at p. 6.) To bridge the gap, the Examiner alleges that:

> It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Ruszczyk and Cooper by adding to it the feature of differentiating cable modems by speed and assigning more frequently unused bandwidth of a given upstream channel to a modem operating at slower data rate such that the bandwidth would not be wasted.

(Office Action at p. 6.) This assertion by the Examiner goes far beyond the teachings of the references. In addition, Applicant respectfully disagrees with this assertion. No matter which cable modem is assigned unused bandwidth, the bandwidth would not be "wasted" as the Examiner contends. Therefore, it does not follow that "one having ordinary skill in the art" would "assigning more frequently unused bandwidth . . . to a modem operating at a slower data rate," as the Examiner reasons.

Thus, for at least for the reasons given above, Ruszczyk, Cooper and Fottak, alone or in reasonable combination, do not disclose or suggest all the features of claim 41. Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claim 41

under § 103(a).

Although claims 48 and 57 are of different scope than claim 41, they include some similar language as claim 41. Claim 48 recites, among other things, "means for differentiating slower cable modems from faster cable modems," and "means for assigning bandwidth to the cable modems based on the differentiation to allow the slower cable modems to transmit data proportionately more frequently than the faster cable modems." Claim 57 recites, among other things, "differentiating slower cable modems from faster cable modems in a cable network" and "assigning upstream bandwidth to the cable modems based on the differentiation to allow the slower cable modems to transmit data on the upstream proportionately more frequently than the faster cable modems." Claims 48 and 57, therefore, are patentable over the cited references for at least the reasons set forth above with respect to claim 41. Applicant respectfully requests that the rejection of claims 48 and 57 under § 103(a) be withdrawn.

4. Rejection of dependent claims 45, 52, and 56 under 35 U.S.C. § 103(a)

Dependent claims 45, 52, and 56 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ruszczyk in view of Cooper and further in view of Kokkinen. Applicant respectfully traverses this rejection.

Claims 45, 52, and 56 depend ultimately on claims 39, 46, and 53, respectively, and include all the features of their respective base claim. Kokkinen does not cure the deficiencies of Ruszczyk and Cooper discussed above with respect to claims 39, 46, and 53. Thus, claims 45, 52, and 56 are patentable over Kokkinen, Ruszczyk, and Cooper for at least the same reasons as discussed above with respect to claims 39, 46, and 53. At least for this additional reason, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 45, 52, and 56 under § 103(a).

In addition to the reasons given above, claims 45, 52, and 56 are patentable over Ruszczyk, Cooper, and Kokkinen for at least one other reason. For example, claim 45 recites, among other things, "determining a mini-slot size based on the modulation and symbol rate of the virtual upstream channel to which a respective cable modem is assigned." The Examiner acknowledges that Ruszczyk "fails to disclose determining mini-slot size based on symbol rate and modulation type." (Office Action at p. 7.) Instead, the Examiner relies on Kokkinen for this feature. As discussed above with respect to claim 11, neither Ruszczyk nor Kokkinen discloses or suggests at least this feature. Further, Cooper does not cure the deficiencies of Ruszczyk and Kokkinen. Cooper also does not disclose or suggest "determining a mini-slot size based on the modulation and symbol rate of the virtual upstream channel to which a respective cable modem is assigned," as recited in claim 45.

In view of the remarks above, Applicant submits that Ruszczyk, Cooper, and Kokkinen, whether taken alone or in any reasonable combination, do not disclose or suggest the combination of features recited in claim 45. Applicant respectfully requests that the rejection of claim 45 under § 103(a) be withdrawn.

Although claims 52 and 56 are of different scope than claim 45, they include some similar features. For example, claim 52 recites, among other things, "means for determining . . . a mini-slot size based on the modulation and symbol rate of the virtual upstream channel to which a respective cable modem is assigned." Claim 56 recites, among other things, "determining a mini-slot size based on a modulation and symbol rate associated with a respective bandwidth request." Thus, claims 52 and 56 are allowable over the cited art for the additional reason similar to the reasons put forth for claim 45 above. Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 52 and 56 under § 103(a).

5. Conclusion

As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicant's silence as to assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, assertions as to dependent claims, etc.) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such assertions/requirements in the future.

In view of the foregoing remarks, Applicant respectfully requests the Examiner's reconsideration of this application, and the timely allowance of the pending claims. If any questions remain, the Examiner is invited to contact the undersigned at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,
HARRITY SNYDER, L.L.P.

By: /Paul A. Harrity, Reg. No. 39574/
Paul A. Harrity
Registration No. 39,574

Date: March 17, 2008

11350 Random Hills Road
Suite 600
Fairfax, Virginia 22030
(571) 432-0800

Customer Number: 44987

Appendix A

An American National Standard

Approved July 20, 1984

IEEE Standard Dictionary of Electrical and Electronics Terms

Third Edition

ANSI/IEEE Std 100-1984
Third Edition

IEEE Standard Dictionary of Electrical and Electronics Terms

Frank Jay
Editor in Chief

J. A. Goetz,
Chairman
Standards Coordinating Committee
on Definitions (SCC 10)

Membership

S. Aronow
D. C. Azbill
T. H. Barton
N. M. Blachman
L. R. Bloom
D. G. Boslaw
J. Bozzo
R. L. Brereton
R. W. Brodersen
N. M. Burstein
E. F. Chelotti
F. A. Denbrock
A. J. Estin
P. Freeny
H. Fickenscher
E. S. Gillespie
D. W. Jackson
R. H. Krambeck
B. J. Leon*
F. J. Levitsky
C. H. Liu
E. E. Loebner
A. C. Lordi
A. Ludbrook
G. H. Mallinson
G. T. Martin
D. T. Michael
J. J. Milos
A. J. Montalbano
R. L. Mueckler
S. C. Newton
T. S. Patterson
J. G. Pearce
F. J. Saal
W. G. Schmidt
R. M. Showers
H. H. Smith
R. B. Squires
R. S. Turgel
C. E. White
W. T. Wintringham†

†Deceased
*Past Chairman

Published by
The Institute of Electrical and Electronics Engineers, Inc.
New York, NY

Distributed in cooperation with
Wiley-Interscience, a division of John Wiley & Sons, Inc.

extensive conducting surface which may be the earth itself. *See:* **antenna.** 179

ground terminal (earth terminal) (1) (industrial control). A terminal intended to ensure, by means of a special connection, the grounding (earthing) of part of an apparatus. 244, 206

(2) (lightning protection system). The portion extending into the ground, such as a ground rod, ground plate, or the conductor itself, serving to bring the lightning protection system into electric contact with the ground. 297, 244, 62

(3) (surge arrester). The conducting part provided for connecting the arrester to ground. 430

ground transformer. *See:* **grounding transformer.**

ground wave (1) (antennas). A radio wave that is propagated over the earth and is ordinarily affected by the presence of the ground and troposphere. *Notes:* (A) The ground wave includes all components of a radio wave over the earth except ionospheric and tropospheric waves. (B) The ground wave is refracted because of variations in the dielectric constant of the troposphere including the condition known as a surface duct. *See:* **radiation; radio wave propagation.** 246

(2) (data transmission). A radio wave that is propagated over the earth and is ordinarily affected by the presence of the ground and troposphere. *Notes:* (1) The ground wave includes all components of a radio wave over the earth except ionospheric and tropospheric waves. (2) The ground wave is refracted because of variations in the dielectric constant of the troposphere including the condition known as a surface duct. 59

(3) (radio wave propagation). From a source in the vicinity of a planetary surface, that wave which would exist in the vicinity of that surface in the absence of an ionosphere. 146

ground wire (1) (data transmission) (telecommunication). A conductor leading to an electric connection with the ground. 59

(2) (overhead power line). A conductor having grounding connections at intervals, that is suspended usually above but not necessarily over the line conductor to provide a degree of protection against lightning discharges. *See:* **ground; overhead ground wire.** 64

group (1) (communications). *See:* **channel group.**

(2) (storage cell). An assembly of plates of the same polarity burned to a connecting strap. *See:* **battery (primary or secondary).** 328

(3) (electric and electronics parts and equipments). A collection of units, assemblies, or subassemblies which is a subdivision of a set or system, but which is not capable of performing a complete operational function. Typical examples: antenna group, indicator group. 17

group alerting (telephone switching systems). A central office feature for simultaneously signaling a group of customers from a control station providing an oral or recorded announcement. 55

group ambient temperature (cable or duct) (power distribution, underground cables). The no-load temperature in a group with all other cables or ducts in the group loaded. *See:* **power distribution, underground construction.** 57

group-busy tone (telephone switching systems). A tone that indicates to operators that all trunks in a group are busy. 55

group, commutating. A group of thyristor converter circuit elements and the alternating-voltage supply elements conductively connected to them in which the direct current of the group is commutated between individual elements that conduct in succession. 121

group delay (dispersive and nondispersive delay line). The derivative of radian phase with respect to radian frequency, $\delta\phi/\delta\omega$. It is equal to the phase delay for an ideal nondispersive delay device, but may differ greatly in actual devices where there is ripple in the phase vs. frequency characteristic. *See:* **envelope delay.** 146, 81

group delay time. The rate of change, with angular frequency, of the total phase shift through a network. *Notes:* (1) Group delay time is the time interval required for the crest of a group of interfering waves to travel through a 2-port network, where the component wave trains have slightly different individual frequencies. (2) Group delay time is usually very close in value to envelope delay and transmission time delay, and in the case of vanishing spectrum bandwidth of the signal these quantities become identical. *See:* **measurement system.** 293, 183

group flashing light (illuminating engineering). A flashing light in which the flashes are combined in groups, each including the same number of flashes, and in which the groups are repeated at regular intervals. The duration of each flash is clearly less than the duration of the dark periods between flashes, and the duration of the dark periods between flashes is clearly less than the duration of the dark periods between groups. 167

group index (denoted N) (fiber optics). For a given mode propagating in a medium of refractive index n, the velocity of light in vacuum, c, divided by the group velocity of the mode. For a plane wave of wavelength λ, it is related thus to the refractive index:

$$N = n - \lambda(dn/d\lambda)$$

See: **group velocity; material dispersion parameter.** 433

grouping (1) (facsimile). Periodic error in the spacing of recorded lines. *See:* **facsimile signal (picture signal).** 12

(2) (electroacoustics). Nonuniform spacing between the grooves of a disk recording. 176

group loop (analog computers). A potentially detrimental loop formed when two or more points in an electrical system that are nominally at group potential are connected by a conducting path such that either or both points are not at the same ground potential. 9

group operation (power switchgear). The operation of